The Territorial Agglomerations of Firms: A Social Capital Perspective from the Spanish Tile Industry

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ABSTRACT Using the Social Capital theoretical framework, territorial agglomerations of firms, such as in the industrial district, can be identified as dense strong-tie networks and are thus suitable for exploiting activities. This paper addresses the possible exploring limitations of these clustered firms. Following alternative explanations, such as the structural holes and weak tie approaches, it is proposed that local institutions may play a role as intermediary agents between external disperse networks and internal dense networks, therefore enabling these firms to deal with the requirements of an ever-changing environment. The paper also develops an empirical section where the Spanish ceramic tile industrial district is described in order to illustrate theoretical arguments. Findings suggested a number of ways in which local institutions may facilitate the creation of value for firms. Particularly, local institutions interact with many external firms and institutions and undertake research projects with local firms. In addition, some quantification of the participation of firms in the activities carried out by institutions is offered, suggesting explanations for the barriers that prevent firms from gaining direct access to external networks.

Introduction

Territorial agglomerations of firms have received a significant amount of attention from researchers in diverse disciplines related to economics and the social sciences. Externalities from physical proximity have been described as a justification of the potential benefits for firms. Concepts such as the Industrial District (Becattini 1990) or the Industrial Cluster (Porter 1990) have analyzed the content and nature of these externalities. Broadly speaking, firms in territorial-based networks develop a set of relationships in the form of “untraded interdependencies” which benefit their innovation and competitive capabilities in different manners (Scott and Storper 1989).

However, many critical voices have also spoken out about the limitations of this pattern of inter-firm relationships. A significant number of researchers have been questioning the capacity of these networks to face radical requirements or changes in the external envi-
ronmental (e.g., radical innovations). In short, its critics argue that the same mechanisms that are the basis of efficient continuous improvements of clustered firms are also considered to be restraints and limitations to coping with more ambitious and radical challenges from a changeable environment.

Taking the above mentioned reflections into account, this research has focused on explaining the reasons behind the limitations of clustered firms and, moreover, on explaining how these firms can develop strategies in order to deal with radical external changes.

To address the research questions, I reviewed ideas and insights from social capital theory describing how characteristics of social networks can affect the exploring and exploiting activities of firms. The industrial district was then identified as a closer dense strong-tie network. It is suggested that local institutions, acting as intermediary agents, can provide the new resources and opportunities needed to face radical external changes in a satisfactory manner.

This paper is structured as follows: first, the social capital perspective is used to propose a theoretical framework to explain clustered firms as a social network and how local institutions can act as intermediary agents that link the internal networks with disperse external networks. The second part of the paper describes the case of the Spanish ceramic tile industrial district through an analytical discussion of the role played by local institutions.

**Theoretical Frameworks**

Innovation varies significantly from one firm to another (Cohen and Levinthal 1990; Dosi 1988) and it is probably the best indicator of value creation (Hitt et al. 1996). Innovation refers to the conversion of knowledge into new products, services, or processes (or significant changes made to existing ones) to be introduced on the market. More specifically, innovation and firms’ capacity to innovate can be associated with the capacity to combine and exchange knowledge resources (Kanter 1988; Kogut and Zander 1992).

Gradual knowledge requires the combination of previously unconnected pieces of knowledge, whereas radical innovations are based on novel conceptual distinctions, or novel ways of combining elements that might already have been associated (Nahapiet and Ghoshal 1998). Either way, since the pieces of knowledge to be combined may reside in different parties, the exchange of information becomes a requisite for combination, and thus for knowledge creation (Cabrera and Cabrera 2002).

Undoubtedly, knowledge and innovation come from both internal and external sources. However, in the recent strategy and innovation literature, much emphasis has been placed on determinants that are external to the firm. These factors refer to the positive externalities firms receive in terms of knowledge from the environment in which they operate. Specifically, interorganizational relationships create opportunities for knowledge acquisition and exploitation (Dyer and Singh 1998; Lane and Lubatkin 1998).

As has been argued in previous works, exchange and combination of resources is associated with the characteristics of the external interactions of the firm with other actors in the social networks. The embeddedness perspective views economic action as embedded networks of ties which firms maintain, even with non-market actors (Oliver 1996). In fact,
networks of social relations penetrate irregularly into different segments of economic life (Granovetter 1985). As an extension of this view, a firm embedded in social structures endows itself with social capital. The key issue in social capital is that networks of relationships constitute a valuable resource for firms. Such links can provide high quality information or access to opportunities.

The function of social networks is to enable the circulation of information and trust, thus leading to economic consequences for development due to the exchanges that are fostered (Gambetta 1988), both in terms of credit and relations between firms, or between firms and final clients. Information and trust were referred to as qualities that would restrict opportunism as a resource enabling cheating or fraud to take place in business (Triglia 2001). Furthermore, the possession of social capital may reduce transaction costs and may also reduce uncertainty (Dosi 1988).

There are two dimensions in the social networks of firms to be analyzed from the social capital perspective. One, which is relational, refers to the strength of the relation, and the other, structural, is concerned with density, that is, whether or not structural holes exist. Granovetter (1973) has pointed out that the strength of a tie is a (probably linear) combination of the amount of time, emotional intensity, intimacy (or mutual confiding) and reciprocal services that characterize the tie. Frequency and intimacy of contacts have been used to measure the strength of the tie. Although frequency has been measured in many ways (Marsden and Campbell 1984), it indicates the number of times an actor (firm) comes into contact with another actor (McEvily and Zaheer 1999). Intimacy also measures strength and refers to the closeness of the firms to their contacts in terms of emotional intensity (Brown and Konrad 2001).

On the other hand, the structural hole argument defines social capital in terms of the information and control advantages gained from being the broker in relations between people who are otherwise disconnected in social structures. The disconnected people stand on opposite sides of a hole in the social structure. The structural hole is an opportunity to broker the flow of information between people and to control the form of projects that bring people from opposite sides of the hole together. Burt (1992) asserted that it is not so much the strength or weakness of a tie that determines its information potential, but rather whether a structural hole exists between a focal actor’s contacts. In other words, the causal agent determining whether a tie will provide access to new information and opportunities is the extent to which it is non-redundant (McEvily and Zaheer 1999). Redundancy is defined as the extent to which the contacts in a focal firm’s advice network are linked to one another. Here redundancy is given a meaning related to the concept of structural holes, which corresponds to the meaning given by previous papers in the research literature (among others: Burt 1992; Rowley, Behrens, and Krackhardt 2000; McEvily and Zaheer 1999), a definition in contradiction to the meaning used by other authors (e.g., Grabher 1993). Likewise, firms basically gain access to non-redundant sources of information from structural holes.

In line with other previous research (Rowley, Behrens, and Krackhardt 2000; Gargiulo and Benassi 2000), I do not consider any type of social network to be better than any other—it depends on the strategy pursued in each case. Weak ties and structural holes are
suitable for exploring new, exclusive knowledge whereas dense and strong ties provide high quality, tacit knowledge exchanges that are suitable for exploiting activities.

The Industrial District

Territorial agglomerations of firms have been conceptualized in many ways. For instance, the concept of the “industrial district” is traditionally defined as a “socio-economic entity which is characterized by the active presence of both a community of people and a population of firms in one naturally and historically bounded area” (Becattini 1990: 39). Industrial districts are usually identified with local production systems (at least as one of the possible forms) that produce rich local competition goods with similar models of governance. The extended relationships that develop under circumstances of physical proximity may vary considerably in their details, although their underlying logic is constant. Industrial districts in southwestern Germany or northern central Italy are based on a set of local circumstances, but the principles of mutual organization on which these districts are based are more widely applicable. Similar inter-firm cooperation is often found in economic activities based in a particular region/supranational area (e.g., Scandinavia) or in contexts where firms from similar industries are spatially concentrated, such as Silicon Valley in the United States. Case studies show it to be a worldwide phenomenon.

Marshallian or agglomeration economies were the first justification of the benefits the industrial district offered firms. The author of the original concept of the industrial district, Marshall (1925), identified a class of external economies that focus on the benefits to be obtained by individual firms or plants from the increased pooling of common factors which include skilled human resources, specialized suppliers, and technological spillovers (Krugman 1991). Likewise, the Marshallian concept of the industrial atmosphere can be transferred into the existence of some intangible resources based on experience, knowledge, and information that are common to district firms. In general, authors now argue that geographical agglomerations benefit firms in the form of intangible externalities or untraded interdependencies (Storper and Scott 1989; Storper 1992), while others emphasize the superiority of this form of industrial organization over mass production and vertically integrated companies (Piore and Sabel 1984; Best 1990). Like Crewe (1996), Russo (1997), or Paniccia (1998), Harrison (1991) pointed out that the most important implication of industrial districts goes beyond the agglomeration economies and refers to the presence of a community of people. Through mutual knowledge and continual contracting and recontracting, experience fosters relational trust (Harrison 1991; Russo 1997; Paniccia 1998), and this relational trust, in turn, limits opportunism among partners in this communitarian industrial district market (Lorenz 1992; Dei Ottati 1994; Foss and Koch 1995). Indeed, relational trust is fundamental in explaining the most important net result of this embedding, namely, the paradoxical combination of cooperation and competition inside the industrial district (Harrison 1991).

One of the primary concerns for researchers in the literature dealing with the district is how to generate the growth of district development within the context of dynamic innovation systems or learning regions. A key issue in this analysis is the concept of path
dependency. This concept has been frequently applied to studies of territorial contexts that influence innovation. The concept of path dependency explains why and how certain technologies prevail in the competitive setting of the marketplace, although they are not always technologically superior. It also helps to explain why technological possibilities foreseen at an initial point in the development or evolution of a new paradigm may not ultimately be pursued, due to the economic effects of lock-in. Lock-in is part of the positive, as well as the negative, story of geographical clusters because it is the capability to innovate within exclusive learning in the network. Lock-in only becomes a problem when learning has been substituted and new knowledge is not absorbed (Cooke 2002).

Recently, the globalization process has affected the development of local systems. At this point both the main arguments put forward by Maskell and Malmberg (1999) are followed. The first refers to the fact that the internationalization process brings with it a process in which previously localized factors of production become more or less equally available in different parts of the world (ubiquitification). So, when localized assets become internationally available they cease to form the basis of competitive advantage. The second argument concerns the remarkable stability of patterns of specialization at the regional level over the last few decades. Both of these findings may be explained by the localized and sticky nature of some forms of knowledge and knowledge creation.

**The Identification of the Industrial District as a Social Network**

As Piore (1990) reported, the “network” metaphor has frequently been used to characterize the relationships among productive units in the district, where territorial proximity is an additional characteristic feature. Moreover, the usage of concepts such as embeddedness and social capital has spread rapidly in territorial literature, primarily as a consequence of the inherently spatial character of these terms (Oinas 1998). Indeed, despite the presence of long-distance interaction, most contacts, especially of an informal nature, are within a short radius of one’s home base (Malecki 1995).

Since social capital has been applied in the context of the agglomeration of firms, the identification of the industrial district as a social network has been considered to be a preliminary question. As the concept of social capital is rooted in the structure and content of relationships, its benefits have been analyzed at a number of different levels of relationships, including individuals, firms, regions, or even nations. According to Triglia (2001), moving to the aggregate level, it may be said that a particular territorial context is richer or poorer in social capital depending on the extent to which the individual or collective subjects of the same area are involved in more or less widespread networks of relations. Firms are embedded in differentiated ways that link them to different sets of players and thereby present them with distinct opportunities and constraints.

The regional level is critical because space and proximity are factors that contribute to the kind of tacit knowledge and the capacity for learning that support innovation (Maskell et al. 1999). Development coalitions are here understood to mean cooperative relations between a wide network of social actors, including workers and managers, but also broader sets of social resources in aid of the process of innovation (Asheim 1996). Moreover,
spatial proximity facilitates frequent, close, and face-to-face interactions. Firms clustered in the same area often share a common culture, which can act to facilitate the process of social learning (Wolfe 2002). Research indicates that such firms build up a common language or code of communication through repeated interaction over time. Finally, this interaction is further supported by the creation of regional institutions, which help to produce and reinforce a set of rules and conventions governing the behavior of local firms and inter-firm interaction. Indeed, Putnam’s “happy” regions are those in which the first industrial districts have flourished. Industrial districts are local production systems: they have always been the alternative to the Fordist big factory (Piore and Sabel 1984). The reason why they could defy the superiority of big firms in leading sectors lies in social institutions of trust and collaborative industrial relations, the use of tacit and codified knowledge, and local institutions.

On conceptualizing these characteristic features authors agree in considering that the industrial district can be seen as a cohesive, dense, strong-tie network of contacts. The traditional perspective of social capital (Coleman 1990) stressed the positive effect of the cohesive structure of the networks on the production of social norms and sanctions that facilitate trust and cooperative exchanges. In the same vein and regarding the relational dimension of social capital, the strong-tie argument suggests that it provides organizations with two primary advantages. First, strong ties are associated with exchanges of high quality information and tacit knowledge, and serve as a mechanism of social control that governs the interdependencies in partnerships (Uzzi 1996). Consequently, the characteristics of these networks are suitable for exploiting existing opportunities through the sharing of high quality information, tacit knowledge, and cooperative exchange (see for example, Rowley, Behrens, and Krackhardt 2000).

**Limitations of Industrial Districts**

In spite of the positive effects of dense territorial agglomerations being generally acknowledged, this characterization has been the object of criticism by many authors who warn of a number of limitations and risks.

It is argued that in a dense strong-tie network, many of the relationships among participants may be redundant ones. Thus, firms may have problems in accessing new, unique information and can only gain limited benefits related to the diversity of information. In other words, firms may find it difficult to deal with (i.e., display rapid detection and response to) external changes, particularly in the case of radical ones such as technological shocks. Grabher (1993) referred to the risk of lock-in and group-thinking, particularly when the district has to cope with external changes. This study has compared different regional districts and concludes that to avoid lock-in there is a need for the loosened ties (*redundancy* is the term used) provided by loosely coupled networks of relatively autonomous firms.

In fact, firms in industrial districts must search for new opportunities to improve and renew their capabilities, especially those associated with innovation. However, the exploring activities imply a high level of uncertainty and risk with respect to the value and extent
to which they benefit the firm. Firms inside industrial districts face problems of search costs in scanning and analyzing new information and opportunities. Supporting this conclusion, the crisis of the Swiss watch industry in the 1990s reported by Glasmeier (1991) may be an interesting classical case. This author described how Swiss watch firms became vulnerable when responding to radical external technological changes, that is to say, they may have had exploring limitations.

This critical view of territorially clustered firms can be theoretically argued by drawing on ideas and insights from the weak ties and structural holes perspectives. They propose an alternative point of view (regarding the traditional social capital perspective), claiming that the benefits derived from access to diverse information and from brokerage opportunities are related to the maintenance of infrequent and non-redundant relationships. Granovetter’s (1973) argument of the *strength of the weak tie* suggests that weak ties allow an actor to access new information. Additionally, it has been proven that the informational benefits derived from weak ties have less to do with the intensity of the tie and more to do with the *structural holes* (Burt 1992) that are normally associated with them. Likewise, firms basically gain access to non-redundant sources of information from structural holes.

In conclusion, by applying these ideas to the industrial district, it can be argued that geographical proximity provides redundancy in interactions and strong ties, which are both suitable for exploiting strategy, although there is also a need for some mechanisms to connect with external (disperse, weak tie) networks in order to generate new and original knowledge and opportunities.

**Local Institutions in Industrial Districts**

In spite of examples emphasizing the limitations of the industrial district within the literature, other cases prove that industrial districts can benefit firms in both exploiting and exploring advantages (for instance, Silicon Valley or Third Italy). Hence, the question to be addressed is how can firms that are redundantly connected gain access to new, external information and opportunities?

Through concepts like weak ties (Granovetter 1973) or structural holes (Burt 1992), authors have suggested that new and exclusive knowledge resources come from non-redundant and infrequent ties within disperse social networks. There are broker advantages to control diverse sources of knowledge from unconnected actors. The point of this paper is that local institutions in districts acting as intermediary agents can take advantage of the broker position and connect the dense district network with disperse external networks. As a result, local institutions can enhance innovation of the district firms.

It is argued that local institutions can enhance firms’ innovation and consequently upgrade their competitive advantage (and profitability). Innovation benefits the performance of firms in different ways, for instance, by giving a higher degree of differentiation or reducing the cost of products/services. Innovation allows firms to put new products or services in the marketplace or to introduce substantial improvements of those already existing. They present new attributes and characteristics and, thus, firms can receive an extra
value from them. Moreover, innovation may also reduce the cost of products or services, and again firms receive extra differential returns (Cohen and Levinthal 1990).

Since innovation can be understood as being knowledge converted into products and services, it is argued that a key factor explaining the innovation capacity of firms refers to the intensity of exchange and combination of knowledge resources. Thus, the innovation process requires external flows of knowledge resources (Dyer and Singh 1998; Lane and Lubatkin 1998). In consequence, it can be concluded that the degree to which a firm has access to external sources enables it to exchange and combine resources, and consequently to generate innovation (Kogut and Zander 1992).

In the context of industrial districts, local institutions have a relevant role to play in the innovation process. Although a great variety of arrangements exists, in general, there is a set of both private and public institutions within the industrial district that carry out supporting activities. Local institutions are defined as locally oriented organizations that provide firms in the local area with a host of collective support services. Examples of local institutions include universities, research institutes, vocational training centers, technical assistance centers, and trade and professional associations. Local institutions such as universities, research institutes, or even professional and trade associations are in contact with many external circles (industrial, professional, cultural, etc.) and they can provide the district firms with new and exclusive knowledge resources that would be otherwise impossible or much more difficult for firms to access.

Two mechanisms are used by institutions to facilitate knowledge and innovation to firms and consequently to improve performance. As intermediaries, local institutions facilitate the acquisition of competitive capabilities by compiling and disseminating knowledge and by reducing search costs.

Local institutions make use of their broad experience in observing others who have dealt with similar problems to act as repositories for knowledge and opportunities for firms (Suchman 1994). In fact, local institutions facilitate managerial innovation by providing access to high quality information together with the resources for acquiring new, and extending existing, knowledge (McEvily and Zaheer 1999).

Local institutions also mitigate the search costs associated with locating external sources of knowledge and specialized expertise that are critical to acquisition capabilities. The search economies generated by intermediaries stem from their maintaining an extensive network of ties with different parts of a social system. Therefore, rather than maintaining numerous ties with different parts of the network, an actor can maintain a single connection with the intermediary that specializes in providing access to and information about competitive capabilities (Galaskiewicz 1985).

In the literature review, robust support was found for the theoretical proposition of the role played by institutions in districts. The existence of local institutions in industrial districts has been widely discussed in the literature. In general authors consider that beyond providing firms with specific support services and other resource benefits (Baum and Oliver 1992), local institutions act as repositories for knowledge and opportunities involving competitive capabilities (Baum and Oliver 1992).
An inventory of experiences can be found in Cooke and Morgan (1998), Cooke (1999, 2002), and Morgan (1999), where the authors reported different cases involving European experiences that point to the existence of an unwritten social constitution which encourages firms, their associations, and local public bodies to support their interests through joint solutions to common problems. One consequence of this is that districts avoid the negative form of competition. Local institutions have a positive role to play in promoting innovation, especially with respect to small and medium-sized enterprises, technology transfer, education, and training.

Consequently, firms can take advantage of having networks of ties with local institutions that provide a feasible source of information on the options available to enhance the firm’s capabilities. On the one hand, this implies a high propensity for experimentation, monitoring, information-processing, and knowledge extraction and, on the other hand, requires network management of the kind described in Cooke and Morgan (1998).

In a very different context, other authors have provided evidence of the impact of local institutions on firm performance in the American clusters (e.g., Decarolis and Deeds 1999; McEvily and Zaheer 1999). Almeida and Kogut (1999) investigated how the relationships among firms, universities, scientists, and engineers strongly affect the extent to which knowledge spillover occurs. Other authors have analyzed the effects of specific local institutions. Swan and Newell (1995) found evidence of the positive effect of the role played by professional associations in the diffusion of knowledge. Moreover, the notion of “innovation community” was proposed as an institutional arrangement fostering innovation (Lynn, Reddy, and Aram 1996; Haake 2002). Likewise, Allison and Long (1987) put forward evidence that institutional affiliation exerts a significant stimulating effect on productivity.

Since externalities can be assumed to exist in districts in the form of knowledge flows and interchanges, a final relevant question to be discussed is the issue of the appropriation of the benefits of local institutions by individual firms. On the one hand, these externalities are semipublic goods, that is, they are shared by district members but they are unavailable to external firms. On the other hand, not all member firms exploit them to the same extent and with the same level of efficiency. This may depend on the distinct individual firms.

As Figure 1 shows, local institutions are relevant actors in networks, providing specific knowledge as a consequence of their position as an intermediary. Institutions are in contact with many diverse and external circles and at the same time are close to the internal district firms; as a result they explore and transfer new, exclusive information, knowledge, and opportunities.

**The Case of the Spanish Ceramic Tile District**

The Spanish ceramic tile industry is used here as an example of an industrial district to illustrate the above mentioned theoretical discussion. This industrial district is located in the Valencian Region in the eastern part of the country (Figure 2) and specializes in the production of ceramic floor and wall tiles. It is made up of a great number of related firms in a bounded geographical area.
A number of authors have identified this Spanish area as an industrial district; in particular, Ybarra (1991) used Sforzi’s method based on the above average density of specialized SMEs in a bounded geographical area. Furthermore, most authors include the Spanish case in the Italian model because of its similarities in origin and evolution with the Italian ceramic tile district (Ybarra 1991). Indeed, it is a natural, historically bounded area that fits Becattini’s definition. The most relevant characteristic features are its high geographical concentration (90 percent of the total Spanish production is located inside the district boundaries, within a 20-kilometre radius of the town of Castellón) and high internal rivalry (no individual firm is responsible for more than 3 percent of total output). In addition, its economic performance shows continuous growth (19 percent annual average sales growth for the last decade) and a high export activity (57 percent in 2000). Finally and particularly in the Spanish ceramic tile industry, previous research has evidenced the competitive superiority of these firms (Hernandez and Soler 2003) and established a causal relationship between local institutions and other collective resources and innovation in district firms (Molina and Martinez 2003).
The aim of this empirical study is not to find a precise (or quantitative) impact of the existence of the local institutions on performance indicators of the district firms (i.e., innovation). The objective is to provide a better understanding of the mechanisms through which local institutions provide knowledge resources that are relevant to the innovation process of firms and how they can help firms to overcome certain limitations, in particular those referring to exploring activities.

The social capital perspective emphasizes the importance of maintaining non-redundant and infrequent contacts with external actors in order to access new and exclusive knowledge resources. Local institutions maintain weak (infrequent) and non-redundant (structural holes) ties with unconnected external actors. Note that this point of view to some extent contradicts the other social capital perspective which emphasizes the importance of dense and strongly tied networks.

I have drawn up a list of institutions in this particular case, describing some of their main characteristics and the activities they carry out. Using qualitative data from a number of interviews based on a panel of experts and practitioners, this paper discusses the way these institutions foster district firm innovation. Some of the restraints of this model of innovation have been included in the discussion. Moreover, the paper specifically analyzes how to visualize the connection of the institutions with different external networks as well as the mechanisms used to pass this knowledge into the district.
In order to highlight the role of the institutions as intermediary agents, general characteristic features of each institution located in this industrial district have first been collected. However, it is important to have a deeper knowledge of some specific issues for further discussion. Hence, a number of specific research questions have been proposed, which have also guided the analysis of the data and enabled this study to offer a clearer and more understandable presentation of the research findings.

The research questions to be analyzed have been formulated as follows:

1) How do local institutions play the role of intermediaries between external and internal networks?
2) How do local institutions create net value for district firms?
3) Why can’t firms gain direct access to external networks rather than through local institutions?
4) What are the limitations of this pattern of networks?

The sample and the sources of data are described in Appendix 1. Table 1 describes selected institutions, summarizing their main characteristic features. The description includes, as well as the name of the institutions, the founders, the content of the mission, the field of activities and the main activities undertaken in each specific case.

A heterogeneous set of institutions with varying degrees of involvement and relevancy in the activities of the district firms were chosen for analysis. In general, institutions are monitoring what is happening outside the district in their specific fields. The support offered by them was focused on R&D or related activities such as designing, technical and productive improvements, and promotional and marketing activities. Institutions are in contact with external networks, such as other associations in different regions or countries and different industries, participating in research forums, conferences, congresses, and so on, and they are involved at diverse levels in European, national, or regional research projects. Institutions provide district firms with new and exclusive knowledge resources by collaborating with firms through joint projects, offering qualified services, and diverse consultancy actions. As a result, local institutions feed the district firms with these new ideas and opportunities in order to be exploited efficiently by internal district firms.

The list includes a broad range of local institutions including the local university; academic institutions belonging to different levels; specific goal associations including those involved in promoting, designing, etc.; the three main trade associations in the district; two technological and trade congresses and fairs; and, finally, a number of regional industrial policy agencies. There are both public and private organizations, most of which are non-profit organizations that were set up with the collaboration of ceramic tile firms, the public administration, and other local and regional institutions. Although the purpose of the institutions is stated as being that of supporting the development of the whole district, in each particular case specific activities are emphasized. Institutions basically operate in the areas of technology, design, and promotion and therefore mainly affect the production and marketing activities of the ceramic firms. Finally, some of the activities carried out by the institutions include technological transfer, R&D projects, advisory services, and promotion and training activities. All the institutions that were selected have some common
<table>
<thead>
<tr>
<th>Institution</th>
<th>Founders</th>
<th>Mission</th>
<th>Field</th>
<th>Main Activities</th>
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<tr>
<td>Universitat Jaume I</td>
<td>Public education center</td>
<td>Higher education and research</td>
<td>Technology</td>
<td>Training, research projects, R&amp;D projects, Design projects</td>
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<tr>
<td>Institute of Ceramics Technology (ITC)</td>
<td>University, trade associations and the regional government</td>
<td>Improving competitiveness of the ceramic sector</td>
<td>Technology</td>
<td>Technological transfer, R&amp;D projects, technological services and training</td>
</tr>
<tr>
<td>University Business Foundation (FUE)</td>
<td>Trade associations and the university</td>
<td>Promoting, fostering and channeling, as well as managing the relationships between the university and ceramics firms</td>
<td>Technology</td>
<td>Intermediary agent between firms and the university, training, and R&amp;D projects</td>
</tr>
<tr>
<td>School of Arts and Crafts of Castellón</td>
<td>Public education center</td>
<td>Vocational training</td>
<td>Design</td>
<td>Human resources training</td>
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<tr>
<td>Institute of Vocational Training Caminàs</td>
<td>Public education center</td>
<td>Vocational training</td>
<td>Technology</td>
<td>Human resources training</td>
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<tr>
<td>Association for Ceramics Promotion and Design (ALICER)</td>
<td>Trade associations, local and regional government, and the research institute, ITC</td>
<td>Improving design policy in the ceramic tile industry</td>
<td>Design</td>
<td>R&amp;D projects, technological advice and services, technology transfer and diffusion, and human resources training</td>
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<td>Association</td>
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<tr>
<td>Association of Ceramics Technicians (ATC)</td>
<td>Ceramics technicians, more than 1000 members</td>
<td>Updating technological information and fostering non-business relationships</td>
<td>Technology</td>
<td></td>
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<tr>
<td>Institute of Ceramics Promotion (IPC)</td>
<td>Local government</td>
<td>Promoting ceramic tiles in the markets</td>
<td>Promotion</td>
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<tr>
<td>Spanish Association of Ceramic Tile Manufacturers (ASCER)</td>
<td>Ceramic tile manufacturers, over 200 members</td>
<td>Defending and promoting the interests of the ceramics industry</td>
<td>Promotion</td>
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<tr>
<td>Spanish Association of Frit and Glaze Manufacturers (ANFFEC)</td>
<td>Frit and ceramic glaze firms, over 40 members</td>
<td>Defending and promoting the interests of the frit and glaze firms</td>
<td>Promotion</td>
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<tr>
<td>Spanish Association of Ceramics Machinery and Equipment Manufacturers (ASEBEC)</td>
<td>Ceramics machinery firms, more than 50 members</td>
<td>Defending and promoting the interests of the ceramics machinery firms</td>
<td>Promotion</td>
<td></td>
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<td>Institution</td>
<td>Founders</td>
<td>Mission</td>
<td>Field</td>
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<tr>
<td>International congress of QUALICER</td>
<td>Chamber of Commerce, professional association of engineers, and other institutions</td>
<td>Open, direct communication between technicians, scientists, and businessmen</td>
<td>Technology</td>
<td>Two-yearly international congress</td>
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<td>International Ceramics Show—CEVISAMA</td>
<td>Valencia International Exhibition Center</td>
<td>Promoting ceramic tiles in the domestic and international markets</td>
<td>Promotion</td>
<td>Annual international trade fair</td>
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<td>Chamber of Commerce of Castellón</td>
<td>Public administration</td>
<td>Promoting local firms</td>
<td>Promotion</td>
<td>Promotion and human resources training</td>
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<td>Valencian Institute of the Small and Medium-sized Enterprise, IMPIVA</td>
<td>Regional public administration</td>
<td>Regional industrial policy agent</td>
<td>Technology</td>
<td>Research projects and human resources training</td>
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features which are relevant within the context of the theoretical developments used in the research. On the one hand, all of them were physically located inside the district, with frequent and repetitive contacts with district firms, and all were committed to backing district development; the activities were therefore directly or indirectly related to the innovation process. On the other hand, all of them maintain connections with external contacts in many different spheres.

With regard to the first research question (how do local institutions play the role of intermediaries between external and internal networks?), local institutions are connectors between two different types of social networks. External networks are diverse and heterogeneous, and in this case actors are not connected to each other. In contrast, district internal networks are dense and close, and actors are connected to each other. Local institutions may attain brokerage advantages through structural holes in their particular network since they are linked to several external, unconnected networks, thus maintaining contacts with actors belonging to different academic, geographical, or industrial circles. As a result, institutions can explore emergent information, resources, or innovations and other significant external changes. On the other hand, firms within the district establish a dense, strong-tie network among themselves. Institutions provide the district with new technology, external innovation, or opportunities, and then firms exploit them efficiently by taking advantage of their dense network. In this way, from the individual firm’s point of view, the district provides firms with an optimal portfolio of indirect ties, which support both their exploration and exploitation requirements.

Findings suggested a number of ways in which local institutions may facilitate the creation of value for firms. The following summarizes the information obtained:

(1) Local institutions offer specific support services, such as technological services (standardization, control of products or control of quality systems). These services enable firms’ quality management to be improved, which is essential for doing business in most industries (McEvily and Zaheer 1999).

(2) The local institutions organize training activities for district firm employees. These activities enhance the human capital in firms. In general, their training programs are about specific or applied ceramics knowledge or skills that would otherwise be difficult to obtain. In addition, the local university and other public academic centers design a number of academic degrees tailored to meet district needs (for instance, chemical, technical, or design engineering degrees).

(3) Local institutions interact with many internal and external firms and institutions. This variety provides the institutions with a specific capacity to compare and evaluate different solutions to problems since they are members of broader scale associations, participate in congresses, or carry out common projects with external partners, and so on. In this way, district firms not only save search costs but also receive a feasible source of information on the options they have available to enhance their capabilities.

(4) They frequently undertake research projects with local firms, and joint research projects are often carried out between researchers from both institutions and firms. Inter-
nal spillovers occur through formal and informal channels of communication, thus allowing district firms to increase their capacity to innovate.

(5) These organizations also promote ceramics products and firms in national and international markets, and in this way local institutions enable district firms to explore new markets while minimizing the risk they take. Moreover, by monitoring international trade fairs, local institutions generate economies of scale for firms. Part of the common promotion is conducted through the development of a district/country brand that benefits all firms.

In order to offer some quantification of the participation of ceramic tile firms in the activities carried out by institutions, I checked the importance of the local institutions in the opinion of the individual firms by surveying a selected group of firms in the district. Later, the number of firms involved in the institution’s main activities were quantified for the period of time under consideration.

This study surveyed the contacts of 20 randomly selected district firms that agreed to provide an evaluation of the importance of local institutions. All the contacts were telephoned and agreed to disclose their ties with the institutions listed. They all confirmed, with no significant differences, that they received a high value from local institutions, particularly in R&D and in promotion activities; they also ranked the importance of the institutions, the most relevant of which were found to be (1) ITC, (2) ASCER, and (3) ALICER.

As an example of the impact of local institutions on firms, the analyses of the activities carried out by these local institutions have been reported in the author’s case study. (1) The ITC reported a number of significant data during 2001. The ITC carried out 107 research projects with 60 ceramic tile firms focused on improving the production process, enhancing ceramic tile characteristics and the development of new products. During this period, more than 250 analyses and tests were performed as technological services. The institute provided quality certification information and documentation. In addition, the ITC carried out continuous training activities, as well as activities to promote the ceramic tile industry. (2) ASCER. During 2001, about 120 firms participated in activities that were carried out to promote the “Tile from Spain” country-brand. This involvement included participation in international trade exhibitions, trade agreements, and so on. On the other hand, over the same period 135 firms participated in some ASCER activity or another, including training, and the dissemination of technological and commercial information. Finally, (3) in 2001, ALICER developed R&D projects with 27 district firms, offered technological services and consultancy to 61 district firms, and endorsed more than 400 technological transfer and diffusion activities. All these activities are specifically focused on ceramic tile design.

Findings from the case study suggested several explanations for the barriers that prevent firms from gaining direct access to external networks. First, one primary reason preventing direct access to external networks is the small size of the firms in districts. Indeed, in most cases these firms do not have significant R&D and marketing departments. Thus,
they cannot afford to make the large financial investments required by research projects or marketing campaigns. By definition, one of the characteristic features of the industrial district is the small size of these specialized firms. Becattini (1990) pointed out that when the size of firms’ growth becomes too much, i.e., it “surpasses the scale,” the conventional form of the industrial district is abandoned. In the case of the ceramic tile industrial district, data collected from the final firms (firms producing finished ceramic tile products) confirm this point. According to ASCER reports, the average number of employees per firm was 90 in the year 2000, and the majority of firms (59.2 percent) had between 25–100 employees; only 9 percent of the firms had more than 200 employees. The second reason concerns the need for an intensive exchange and combination of resources in the innovation process, and consequently an important inter-firm coordination effort is also required. In the industrial district there is a high degree of specialization, and hence knowledge and innovation involve efforts by other groups of firms. Specialization accelerates individual knowledge accumulation, although that same specialization makes no sense without some form of organization between individual firms, since the relevant information comes in an incomplete and lagging way. Hence, the problem facing firms is not so much one of how to achieve an efficient assignation of the available resources, but rather how to secure the best use of the resources that each member of the district possesses for uses which are of an importance known only to them. Local institutions may act as coordinators of this process. They play the role of a third party in coordinating activities among different firms within the district.

Finally, the high transaction cost of knowledge transfer in the open external markets is also observed. The barriers can be justified since searching for new opportunities to improve the innovation capabilities of firms implies high levels of uncertainty and risk. Firms can avoid risks by using local institutions to provide a feasible source of information on the existing options. Regarding the transmission of tacit knowledge between two organizations, difficulties in the formalization of these resources make transmission through market relationships difficult. If the transaction involves specific investments, they should be safeguarded against the risk of opportunism. The industrial district has been defined as a communitarian market—a kind of intermediate institution between market and hierarchy. In this context, mechanisms to safeguard transactions arise (for example self-enforcing agreements), which involve relational trust and reputation. In addition, it has been argued that these mechanisms are more effective and less costly as a means of protecting specialized investments (Sako 1991). Consequently, knowledge transmission between local institutions and district firms lowers transaction costs in comparison with the knowledge transmission of external firms.

In spite of the benefits for district firms and their being denied direct access to them, this pattern of relationships with local institutions also presents a number of limitations or restraints. In contrast to the above mentioned benefits, this analysis also highlights a number of challenges in transferring resources from local institutions to firms. Three have been underscored: the lack of general coordination, the difficulties in protecting innovations, and a possible agency problem. Since not all institutions had a deliberate strategy, a number of
overlaps can be detected in their actions. Local institutions compete with each other for certain activities or resources. For example, the Institute of Ceramics Technology (ITC) can compete with university departments (those involved in inorganic chemical and mechanical engineering) to carry out a research project with district firms, or a number of institutions can compete for similar training activities. It is clear that there is no global arrangement or plan to coordinate the actions of institutions. In addition, the unbalanced contribution made by the local institutions to the creation of benefits for firms is a factor that must also be highlighted. Some of them play only a marginal role, while others (in particular the ITC, ASCER, and ALICER) are critical for technological and market innovations. In fact, there is no systematic control of the impact of the institutions’ activities on the outcomes of the firms. A second limitation concerns innovation protection. Once firms acquire knowledge from institutions, they must deal with the problem of safeguarding that new knowledge or innovation, especially with regard to other local competitors. Proximity and intensity in interactions expose them to copying or expropriation of their knowledge and innovations by competitors. Managers reported the limited use of legal rights protection, such as patents and copyrights, in the district. The same conditions under which knowledge diffusion is favored inside the district can be seen as an obstacle to its protection for individual firms, even when the firm has made an effort to achieve it. One final problem should also be mentioned. From the point of view of economic rationality, one of the problems firms face in collaborating with local institutions concerns the risk of a sub-optimum effort by the institutions (i.e., agency problem) due to the lack of incentives. The contracts drawn up to control the joint projects rarely contain any kind of incentive or bonus for the institution. However, it must be noted that local institutions are non-profit organizations and, consequently, non-opportunistic behavior in the relationship with firms can be expected.

Discussion and Conclusions

The primary aim of this paper is to gain a better understanding of the opportunities and restraints produced by geographical proximity using the social network approach. By integrating both social capital and theoretical territorial perspectives, it is concluded that a territorial agglomeration (i.e., an industrial district) could be characterized as a dense network with strong ties among participants. Hence, firms can benefit from exploitation of existing resources and opportunities rather than from exploration of new ones. However, it has also been argued that local institutions, acting as intermediary agents, could provide firms with new sources of opportunities and resources collected through their external networks, which are rich in structural holes. Thus, industrial district firms may pursue strategic objectives through both exploitation and exploration.

In spite of this general conclusion at least a couple of issues remain to be discussed in further detail, namely, the possible negative effect of local institutions and the role played by other actors in the district, particularly large firms.

I agree that local institutions may also have a negative effect since they can reinforce a lock-in situation through too strong a focus on internal networking. Moreover, a more critical analysis of the role played by local institutions should include not only the risk of
lock-in but also other limitations of the model including the lack of general coordination, the difficulties in protecting innovations, and a possible agency problem. So, the question may be one of when or why local institutions benefit firms or avoid lock-in. Generally speaking, insofar as local institutions act as an interface, they do benefit district firms. More specifically, success depends on how key institutions coordinate their efforts, and the extent to which they cooperate in order to achieve mutual benefits; in other words, it depends on how well they function as a collective entrepreneur and at spreading some kind of advantages in terms of costs and innovations and social adjustment throughout the territory (Morgan 1997). Other authors have argued that the existence of a positive effect of social capital depends upon the ability of people to associate with each other and the extent to which their shared norms and values allow them to subordinate their individual interests to the larger interests of the community (Putnam 1993; Maskell 2001).

On the other hand, although this paper has focused on local institutions, I acknowledge the possibility of other participants in the district playing the role of intermediary agents with respect to the external networks. This is the case of large firms, and there is a need for a review of the role played by large firms inside the district. A more traditional view in the literature is that of Becattini (1990), who emphasized small firms as being characteristic of the definition of the industrial district. To support this statement, a process of desegregation from large to small-sized firms is suggested by some district case studies, such as Il Prato (Lorenzoni and Ornati 1988) or Modena (Lazerson 1995). More recently, in contrast, industrial district theorists have reviewed the presence of the large firm within the district. This fact has meant not only underlining the role of the large firm in the districts but also reconsidering internal heterogeneity and questioning the existence of the industrial district model (Rabellootti and Schmitz 1999). According to Lazerson and Lorenzoni (1999), larger firms frequently organize production among groups of smaller firms, introduce technological innovations, and expand existing markets. Moreover, Bellandi (2001) proposed that involvement in knowledge exchange and institutional building, and therefore the identification of developmental embeddedness, is more probable where and when local factors are neither too weak nor too strong, and in the presence of contextual policies fostering the developmental role of large units. Finally, some authors try to combine leadership, institutions, and large firms. According to Cooke (2002), the emergence of some of the more successful clusters can be attributed to the role played by leading research institutions, and the location of a dynamic large firm with strong linkages to the global economy has a demonstration effect for other firms in the cluster, as well as providing a continuous source of spin-offs to feed the process of new firm formation.

In this case (and broadly in all Spanish cases), however, the small size of firms is one of the reasons accounting for the barriers that prevent firms from gaining direct access to external networks.

Findings of this research are in line with previous studies emphasizing the importance of the social aspects of the industrial district (Becattini 1990; Lazerson 1995). However, the paper also looks into the relationships of the district with external networks in order
to explain the chances they have of updating as well as gaining access to new information and resources. The propositions of the paper give support to authors who consider it possible to conciliate the contradictory perspective in social capital. That is, both the exploiting and exploring perspectives are useful in explaining benefits for different strategic objectives (Rowley, Behrens, and Krackhardt 2000). Two different types of requirements can be identified according to the explorative or exploitative purpose of the relationship. In the case of exploration, firms are focusing on obtaining new information from many different alternative sources. Here, information is relatively broad and general in nature, due to the fact that emphasis is placed on the identification of viable alternatives rather than on a complete understanding of how each innovation must be developed. And regarding exploitation, the emphasis is on refining an existing innovation in order to gain efficiency in a particular area. Therefore, in an evolutionary context, firms should have a mixture of both types of ties (Rowley, Behrens, and Krackhardt 2000).

On the other hand, the findings of this paper may contradict some case studies that base their arguments on exploring the disadvantages of the district and, in particular, on questioning the capacity of the district to access new information and on pointing out its vulnerability in responding to external technological changes (Glasmeier 1991). This is also the case for other kinds of negative effects produced by closed and dense networks (Lazerson and Lorenzoni 1999).

This paper may contribute to industrial district and social capital research in several ways. It has discussed the interorganizational characterization of industrial districts, pointing out the opportunities and restraints they offer. As a result of the conclusions, some strategic recommendations can be presented. Firms should interact with local institutions and other district participants in order to improve local environmental conditions. Dynamics between the formation of tacit and codified knowledge and other elements of the innovation processes call for a reassessment of institutional arrangements. Firms may pursue diverse strategies for knowledge and skills resourcing. These include, among others, strategic partnerships with key institutions to influence the education and training of future researchers; research collaboration with individual academics or departments in universities in order to gain early access to research; or, finally, the creation of hybrid research organizations between firms and institutions to develop common research programs. In conclusion, development of a distinct firm strategy is needed in order to shape and leverage the collective resources provided by local institutions in an optimal way.

Finally, this research has raised a number of further questions. In fact, these points can be viewed as possible limitations of this paper. (1) The fine-grained process through which network structure is created or modified is an interesting and important area for future research. Another fruitful area of inquiry is the dynamics of how firms’ networks evolve and change in response to external challenges and opportunities. In other words, to what extent does inertia constrain a firm’s ability to reconfigure its pattern of network ties? (2) On the other hand, the processes of cooperative competition in geographical clusters could greatly benefit from a more detailed analysis of the mixture of cooperation and competi-
tion in networks. The balance between inter-firm cooperation and competition, while a popular idea, warrants greater research attention, particularly in the network context. (3) A final question may be raised as to the diversity of local institutions. Since they may be predominantly from the same industry, then the information accessed by local firms could be less diverse. A deeper analysis of how local institutions vary in terms of the scope of the activities they carry out is therefore needed.

REFERENCES


Appendix 1. Description of the Sample and Sources of Data

The sample. The final sample of institutions was the result of checking different lists against one another. The author used official membership listings of the main trade associations and the institutional listings of the Chamber of Commerce and the Regional Government. Additionally, the resulting sample was controlled using a panel of firms from the district. A total of 15 different local-based institutions were investigated, although some of them also operate on a broader scale. A number of considerations regarding these local institutions must be mentioned. For instance, although trade associations are focused on the district, due to the high concentration of activities, they also include external firms located outside the district. Furthermore, since Spanish industrial policy is regionally decentralized, the regional or autonomous administration plays the most significant role. Finally, the study has deliberately excluded external institutions, whether national or international, which may also operate locally, but play a minor role in the district in comparison with the other fields of activities.

The sources of data. The sources of data were, on the one hand, the reports of the selected institutions and, on the other hand, a number of personal interviews carried out with representative members of these institutions. First, I had access to internal reports and publications and, more particularly, reports concerning annual activities from all the institutions. Although the quality of the information received varied significantly from one institution to another, I was able to create a common database which provided detailed information about a number of characteristic features such as the creation of the institution, its organization, activities, external contacts, and its relationships with district firms.
In addition, twenty semi-structured interviews were conducted with key members of local institutions. Each interview lasted approximately two hours and was recorded and later transcribed for analysis. These semi-structured interviews were run freely using the research questions to guide the conversation. Fieldwork was carried out during fall and winter of 2002.